

OBSERVATIONS and ORIGINAL THEORIES
on
INTRACRANIAL PRESSURE
and its
RELATION to SOME FORMS of NERVE
DISEASE.

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Mrs. Bel 1898.



The intracranial circulation and changes therein will obviously have a far reaching effect on the nervous system and the bodily systems in general.

The state of unconsciousness is produced by diminution in intracranial pressure or by increase of intracranial pressure. The larger number of diseases related to alterations of pressure within the cranium is due to an increase rather than a diminution.

Intracranial pressure must remain constant and not only constant but uniform, if not, then we get symptoms occurring which vary in their intensity according to the amount of increase or diminution of such pressure.

Nature has given means to prevent alterations in this pressure.

It is only after those adaptations of nature have been overcome that we have phenomena which indicate departure from the normal - Phenomena which do not however necessarily mean disease.

For example we may consider the natural methods of minimizing marked alterations in the blood pressure - such as the tortuous character of the cerebral vessels - the transit of the large arteries through bone - the innumerable and minute branches of capillaries into which the vessels are broken up before/

before entering the brain substance - the lack of anastomoses between the central and cortical vascular systems - the arrangement of what we may call for convenience the veins within the cranium. (The veins enter the superior longitudinal sinus in an anterior direction, that is upwards and forwards - the blood flows in the sinus from anterior to posterior, so that the blood conveyed in the small veins to the sinus is removed from the brain slowly so as not to produce sudden alterations in the intracranial pressure. Its slow removal is proof that the blood has more work to perform than merely trophic functions).

The Superior longitudinal sinus is triangular with the narrow angle next the brain substance, the bone is grooved for the broad end. The Chordae Willisii pass across the inferior angle of the sinus, thus preventing undue dilatation and pressure on the brain.

Yet another instance of such arrangements we have in the existence of perivascular lymph spaces in the brain; likewise the existence of cerebral fluid which is of the utmost importance in several abnormal conditions and stands in its importance as a fluid of the body second only to that of blood.

It is a fluid which permeates the whole nervous mechanism/

mechanism. It is not stagnant but is capable of being displaced down the cord and being accommodated by the Theca Vertebralis; it is also accommodated in the large neuroglia cells of Deiter, likewise in the pericellular lymph spaces which communicate with perivascular lymph spaces and those again with large spaces at the base of the brain. It is very closely associated with the vascular system.

In the brain we find the termination of cortical vessels in a capillary network around the large pyramidal cells and between the cortical and central vessels we have an area probably closely associated with changes going on between cerebral fluid and the vascular system.

This cerebral fluid may in some instances I think ultimately reach the coccygeal gland and there by reason of the close relationship with vessels it may be absorbed or it may undergo compression by the tendinous and muscular surroundings of the gland and its trabeculae; moreover by the physiological movement of compression of the gland in the process of defaecation it may be expressed through the skin. The fluid may also have an exit through the nose.

This fluid is an internal perspiration, it is in other words nervous sweat, the more our nervous mechanism is stimulated and thrown into action the more/

more fluid is formed. This I have proved by my own observation in several post-mortem examinations in cases of Heat Apoplexy of varying intensities.

There are some cells in the brain which are nothing more or less than brain sweat glands, they absorb fluid from the brain and by means of channels convey that fluid to the region of blood vessels, whether the vessels communicate directly it is difficult to say but there is a communication between the sheaths of vessels and nervous fluid.

It is a fluid capable of being rapidly effused and rapidly absorbed. In the aged it is large in amount because in advanced age we have atrophy of the nerve substance proper and so we have a corresponding increase in the fluid in such a quantity as will keep the pressure in the cranium uniform and constant.

There is undoubtedly a nervous circulation which has been overlooked and some diseases may be due to derangements of this circulation.

We may here consider some of these conditions.

In General Paralysis of the Insane we have a disease closely associated with alteration in the intracranial pressure.

On Post-mortem examination we find diminution of certain structures on the one hand and increase on the other. We find atrophy of the central and precentral gyri, basal ganglia, pons, medulla and brain substance generally; on the other hand we

find the membranes thickened, haemorrhagic deposits, increase of cerebral fluid, and turbidity and vessels often congested, to compensate for the atrophy.

As causes we have everything that will tend to produce increased nervous strain, stimulants, excess of sexual excitement, neglect of sleep, all of which point to an increase of blood pressure which is intracranial.

We find it a rare disease amongst people of quiet, undisturbed, hopeful state of mind. People on whom strong impressions do not act in an intensely severe manner - people who have moral control over themselves - people who lead an even life in the country as agricultural labourers - those are the class in whom the disease rarely appears.

As opposed to those we have the vigorous, plethoric, excitable, easily worried, keen business people - it is in those we find the disease prevalent.

In General Paralysis we have increased blood flow to the central nervous system which is constant in its character, to begin with we have vertigo, congestive attacks, Cutaneous hyperaemias, gastrointestinal disturbances, we have disturbances of speech, gait, handwriting, irregularity of the pupils, partial paralysis, convulsive seizures, tremors, and in/

in short, everything that points to a highly strung overstimulated nervous constitution. If we have this condition of things then we have increased blood pressure, this is present within the cranium, is constant, and goes on from bad to worse. The brain structures are stimulated, are highly developed and grow, they are eventually over stimulated, over-developed and so degenerate and atrophy, and so we find post-mortem atrophy and hypertrophy side by side and keeping intracranial pressure constant.

During the progress of the disease we may get epileptiform or apoplectiform seizures or frequently congestive attacks of an abnormal nature on the least excitement. For example one frequently observes a general paralytic during some slight exertion as in a game of bagatelle or such like become cyanotic in appearance and have slight convulsive seizures.

In General Paralysis there is an overflow of blood to the brain which is either not compensated for at all or not to a sufficiently large extent by nature's adaptations namely the circulation or displacement of cerebral fluid or its absorption by the blood but is compensated for by degeneration and atrophy of vital structures.

It is a disease which in some respects resembles Epilepsy.

Epilepsy - is regarded by some observers as a nervous/

nervous disease presenting several types of which there exists a type of cardiac origin. Little is known regarding the pathological changes occurring in a patient the subject of Epilepsy for the simple reason that what changes do occur are purely of a temporary character and pass off gradually as the patient recovers from the fit, unless the condition of "Status Epilepticus" is reached and the person goes on having "fits" at various periods, then the changes are found to assume a long standing and permanent character and are associated with mental deterioration and forms of insanity. Those changes are fatty alteration in cells, vacuolation, disintegration.

Epilepsy as a disease has as many theories as to its nature as it has remedies. We have it described by some authors as "an Explosion of Nerve Energy." Epilepsy is an explosion of Nerve Energy but that idea does not help us very far towards the solution of the difficulty. Then we have it described as a "Commotion of Nerve Cells." There may be excited action or even tumultuous action but there is no irregularity. Nerve cells act when the stimulus is applied and only those cells act which are stimulated, there is no irregularity whatsoever in their action.

Epilepsy is also described as due to a "toxin" of/

of what nature it is not known, present in the blood." This Toxin Theory advocated by Drs P. Cololian of Seine Asylums and Dr C. A. Herter of New York has been gaining ground recently and after a series of examinations post-mortem and otherwise, on Epileptics I have concluded that there is undoubtedly an abnormal substance in the blood more especially marked after a "fit."

The blood normally acts as a medium for the absorption of all refuse matter from all the tissues and for their conveyance to those organs whose function it is to separate them and cast them out of the body.

So in Epilepsy we find the blood acting normally by taking up refuse matter. This refuse matter might be putrefaction products from derangement of the gastro-intestinal canal, or might be various cocci or nervous tissue products. It is not always a toxin but rather a normal constituent of the body in a place where we don't usually find it in a condition of health, to such an extent as would justify us calling it a toxin.

Its presence in the blood is explained by nature's mode of relief.

If it were not for the presence of this substance in /

in the blood a temporary natural cure could not so speedily take place.

This substance which is in the blood, is to a large extent Cerebro-Spinal fluid which could not be displaced rapidly enough and therefore has been absorbed. The existence of this in the blood accounts for the rapidity and freedom of coagulation which is exhibited by the blood of an epileptic after a fit.

Dr Carstairs Douglas, one of the Clinical Research Scholars of 1903 in connection with the British Medical Association made 300 observations on pregnant, non-pregnant, eclamptic and albuminuric women paying special attention to the coagulability of the blood. He concluded that the blood did not clot more quickly in Eclamptic than in normal pregnant and puerperal women. I think if attention had been paid to the time of examinations in relation to "fits" Dr Douglas might have observed different results.

An albuminoid exists in large amount in the blood of an Epileptic immediately after a fit also in inflammatory cases. We sometimes get it in the urine after a fit. This albuminoid is not produced periodically in the body owing to anomalies of nutritive exchanges. If a person has albuminuria already it naturally adds to the severity of a case.

I may here glance at a few of the theories advanced regarding the occurrence of Eclampsia or Epilepsy (for Eclampsia is Epilepsy with a special cause namely the presence of a living foetus).

Frerich's Theory - Eclampsia is due to the presence of urea in the blood. But urea has been injected into the blood and has not caused convulsions.

Stumpf's Theory - Eclamptic fits are due to the circulation in the blood of some poison produced by an abnormal decomposition in either mother or child, - a substance free from nitrogen perhaps acetone, - or a body which reacts to the same tests, may be formed.

There is not a direct communication between foetal and maternal blood. There is not alteration in the blood of a foetus of an eclamptic patient, and post-mortem I have found nothing which points to any abnormal change or decomposition of any kind in the mother or child, unless the putrefactive products of the gastro-intestinal canal already mentioned.

Fehling's Theory - Nephritis of Pregnancy is not the cause of Eclampsia but the first sign of intoxication.

Eclampsia if it supervenes is the second - Death of the foetus is favourable to Eclamptic cases and so the cause is produced in the foetus.

This view is correct so far as it goes but death of the foetus does not prove the cause to be produced in the foetus.

Schmorl's Theory - Eclampsia is produced by a coagulating /

coagulating producing ferment which originates in the placenta. On examination of the placenta however no trace or evidence of this substance can be adduced.

Urinaemic Theory - This theory is being largely adopted namely that "fits" are due to retention of normal urinary toxins owing to failure of the function of the kidneys. With the onset of symptoms of eclampsia urine diminishes in toxicity also amount, coincidently with recovery from the fits urine increases in toxicity and amount. This theory furnishes no explanation of the post-mortem conditions met with in the liver namely haemorrhages varying in size also areas of engorgement nor why it should occur where there are no signs of renal disease.

Bonchard's Theory - Attributes the cause to failure of function of the kidneys and liver, as a result intoxication occurs from urinary extractives, biliary substances, ptomaines no longer destroyed in the liver.

This theory is incorrect because there is no doubt the foetus plays an important part in the production of eclampsia and if Bronchard's Theory is correct we could have eclampsia in a non-pregnant woman. It is however an autointoxication.

Bouffe de Sainte Blaise Theory - says the haemorrhagic /

haemorrhagic conditions in the liver which are seen post-mortem are the cause but these haemorrhagic conditions are also found in the kidneys, lungs, pancreas, spleen, and there is no reason to believe that it is due to changes in one Viscus more than another.

The Neurotic Theory - is that it is due to heightened irritability of nerve centres. It explains why eclampsia can occur independently of renal disease. This theory explains all the post-mortem appearances found but unfortunately no practical evidence of this has yet been discovered.

Another theory is that Epilepsy or Eclampsia is of Bacterial Origin. Staphylococci Pyogenes Aureus and Albus are often found in the blood.

The true explanation is got by a combination of parts of all those theories, but no single theory is correct and adequate to explain the phenomena of the disease.

In explaining what I consider are the correct views let me first state again that Eclampsia and Epilepsy are the same disease, that the renal condition is secondary.

The cause of Eclampsia is not in the foetus or a toxin produced by the foetus but is the existence and presence of the foetus or due to it having been present. It is the same thing as occurs in Epilepsy caused by the irritation of a tooth in a child, as the inclusion /

inclusion of a nerve in the callus of an old fracture, as paraphymosis, as convulsions after a burn, and worms and numerous other conditions. There is a toxin which is an autointoxicant.

The heart in its action is to a large extent influenced by other organs. For example irregularities and palpitations accompanying dyspeptic symptoms and hysterical conditions. The action of the heart to a large extent depends on the action of the brain, and the brain on the action of the heart. They are interdependent. The mind and the body are closely associated, the actions of the various organs of the body depend on the mind, and not only can the mind be trained to influence the action of organs but it can be used as a resisting power against disease and as a curative agent. I have no doubt whatsoever but that the best preventative against disease of an infectious nature is a form of mind which offers strong nervous resistance against impressions.

The condition known as Eclampsia and some forms of Epileptic convulsions are due to a derangement in the cerebral circulation both of blood and cerebral fluid caused primarily by a strong stimulus from the uterus.

A strong impression stimulates the sympathetic causing /

causing greatly accelerated cardiac action, the natural tone of the vessels maintained by the sympathetic is overcome and we get an afflux of blood within the cranium and to other organs as well. The dilated vessels within the cranium irritate certain areas in their neighbourhood stimulating those areas and this stimulus gradually spreads, the dilatation, irritation, stimulation, giving rise to auras, actions, convulsions, according to the area stimulated and in strength varying with the extent of stimulation.

The various degrees of dilatation and the various powers of the vessels to regain their tone form factors which influence the strength and length of the seizure. The strength depends on the extent of dilatation whether it is "petit mal" or "grand mal". The length of the seizure depends on the power of the vessels to regain their tone and the rapidity of absorption, also on the rapidity with which the fluid contents of the cranium change their position and compensate for the great rise in intracranial pressure. This intracranial pressure is caused primarily by a great increase in blood pressure, a pressure which in Eclampsia is not only increased intracranially, but in the liver, causing haemorrhagic conditions in the weaker parts and rupture of the smaller vessels. In the blood we have the special /

special toxin or coagulating producing substance, which is got not from the foetus or placenta but is absorbed by the blood from the central nervous system where the displacement and nervous circulation of fluid do not sufficiently rapidly take place so as to counteract the rise in blood pressure and keep intracranial pressure constant.

This coagulating producing substance, or toxin or autointoxicant, all are the same substance, viz:- The nerve fluid.

In the kidney we find anaemia and hyperaemia side by side. There is a great demand thrown on the kidneys to get rid of this abnormal constituent of the blood, this nerve fluid, and so we get the kidney overworked. This anaemia is produced by the blood coagulating in the smaller vessels owing to the presence of this nerve fluid in the blood. The haemorrhages are due to the rise in blood pressure. Exactly the same condition is found in the brain and liver, hyperaemia and anaemia side by side so are haemorrhage and oedema just as in the lungs. And so the urinaemic theory has some foundation but it does not give a cause. The Urinaemic theory is based on nature's process of relief of fluid, of relief of pressure from overworked and overloaded organs and primarily an overstimulated brain.

The /

The foregoing also explains why eclampsia can take place in a person who has never had renal mischief, and who after recovery may not have renal disease. Eclampsia is not caused by an inflammatory condition of the kidneys. The kidney condition is secondary.

In a patient of my own, a primipara, the subject of very severe eclampsia I safely delivered by forceps and kept her well under the effects of a mixture of Bromide and Chloral as the eclampsia continued after delivery. During this period all fluids of the body were freely excreted and the natural channels of the body were kept open. On the fourth day she came out of her sleep, but slowly afterwards developed puerperal insanity of a maniacal type, she had albuminuria during this period, she did not improve and became very unmanageable. I had decided on her removal to an asylum but just before removal I tested her urine once more and found that it was loaded with albumen and was being passed much more freely. I considered my patient was getting better, refrained from certifying her as of unsound mind provided she was properly looked after at home. This was done and towards the end of the third month after the pregnancy, the urine was quite clear and free from albumen /

albumen, the brain functions were normal and she made a full and complete recovery without her next door neighbour knowing that she had been insane.

In a "fit" we have changes in hearts action, in vessel action, in blood, in nerve action, respiratory changes and all those factors influence blood pressure.

In a patient the subject of "fits" the friends around can tell when a "fit" is likely to take place owing to the patient's actions and appearance.

The patient shows a tendency to irritability of temper, the pallid look of the face is due to the tone of the superficial vessels being increased through the sympathetic and so drawing the blood from the superficial parts to the deeper and more vital organs :- (observed by lancing gums in children at various stages during convulsions, it is impossible to draw blood by lancing a child's gums during a convulsion.) Also clinical study of the patient's pulse shows a lowered arterial tension, and also acceleration,

Towards the end of a fit the observer will notice a condition of things which points to relief of blood pressure. Fluid is poured out of every channel, the suddenness with which the fit occurs accounts to a large extent for its severity.

After a fit has occurred it is apt to occur again as once the vessels have been dilated, they dilate /

dilate a second time more easily and so a child the subject of convulsive fits may develop into an epileptic.

During an attack of "fits" as occurs in eclampsia instead of the cerebral fluid being diminished in quantity it is increased. The more the nervous system is thrown into action, the more fluid is formed. So that our prognosis must be guarded. The prognosis is grave until the cause (the foetus) is got rid of. The more fits the worse the prognosis. The amount of urine passed, the quantity of albumen in it, are guides to us. If there is a large quantity of albumen, this does not always mean that the prognosis is grave but rather a favourable sign as I have shown in the previous case mentioned.

In an Eclamptic case with no previous sign of renal mischief a large quantity of urine and albumen shows that the kidneys are getting rid of the refuse.

I have frequently found albuminuria present in pregnant patients without the production of eclampsia because the nervous fluid has been displaced and absorbed slowly, has counteracted the blood circulation in the cranium and has kept the pressure constant and has been slowly excreted by the kidneys.

Sometimes I have seen patients dazed, have short /

short periods of unconsciousness resembling "petit mal" or simply a slight twitching of the muscles at the wrist. This is explained by the space between the brain substance proper and the vessel being overcome but the fluid contents of the space have been absorbed or displaced so that the condition goes no further. If the wrist twitches it shows that the vessel has touched and stimulated the brain in that area. This short period of unconsciousness allows the vessels to regain their normal tone.

Who amongst us during long periods of hard reading has not experienced short periods of reading unconsciously ? We have to go back to gain the thread and connection of what we have been reading. This is a seizure of even less degree than "petit mal". Such a seizure is one during which no part of the brain has been stimulated but means a period during which the position of cerebral fluid has been changed until the vessels regained their tone. If such mental fatigue be continued the reader would become the subject of idiopathic epilepsy.

This view of albuminuria explains all cases of a functional nature. It likewise explains the cases of intermittent albuminuria.

In the British Medical Journal February 16th
1901 /

1901 in an article there, W. Collier, M.D., F.R.C.P., describes the case of a young man absolutely healthy in every organ but whose urine was clouded with albumen, the amount being increased by muscular exercise. Collier says it is of gradual onset and may not be perceived for years and due to some abnormality in the vessels of the kidney, that with the increase of blood pressure due to the muscular exertion serum exudes through the vessel walls. An interesting thing to know would be if the coagulability of this man's blood was altered. Also the difference in coagulability of this man's blood and that of an ordinary epileptic. Why should the blood pressure increase in the kidney more than in any other organ? It will increase in all the organs and given the same condition in the brain as in the kidney namely increase in blood pressure then we should have the blood circulation and nerve fluid circulation to settle the matter between them so as to keep the pressure constant, this they do by displacement and absorption, if not then Dr Collier's patient would be virtually an ordinary epileptic.

Dr Collier goes on to say that it would be very interesting by a systematic examination of the urine to ascertain the percentage of this form of albuminuria /

albuminuria at one or other of our large schools. He says that at Oxford he is constantly coming across cases undiscovered because it gives rise to no symptoms, and that treatment is of no avail, that if it be present the first year it is present the fourth.

I think that the presence of albuminuria may not mean that the student has indulged in excess of muscular exercise, it may mean that he has indulged in cerebral exercise and it will not improve unless he gives up not only muscular exercise but cerebral or limiting one or both might improve the condition, it entirely depends upon the rise in blood pressure. Intermittent Albuminuria may become constant.

A great aid in those cases is to keep all the channels open even the nose by means of sneezing.

In a case of Epilepsy which I attended, the husband of my patient volunteered the statement that his wife had all her life a bad habit of frequently blowing her nose but since she grew ill, her nose had grown dry and she had never blown it once in a period of four days.

On examination I found the patient dry all over and in a condition of "Status Epilepticus" from which she died. This patient never had epileptic fits previous to this.

To /

To sum up we have :-

- 1st. In Epilepsy a strong impression stimulating the sympathetic (In eclampsia the presence of the foetus.)
- 2nd. Increase in the tone of the vessels superficially seen in the pallor.
- 3rd. Increase in hearts action and increase in blood pressure, overcoming the tone of the vessels in the brain.
- 4th. Afflux of blood to the brain, dilating vessels, overcoming perivascular lymph spaces, displacing the contents cerebral fluid, absorbing some, irritating the brain and causing aurae and convulsions according to the area stimulated.
Post-mortem examinations prove that the vessels are dilated.
- 5th. The cerebral fluid absorbed by the blood accounts for the coagulability of the blood after a fit.
This fluid goes to the kidneys and is thrown out causing albuminuria.

If displacement of cerebral fluid be sufficient to counteract increased blood pressure and no fluid is absorbed we find that albuminuria is not produced. I have seen a case of a pregnant woman have a convulsion during labour and she had no albumen in her urine.

Increase /

Increase of pressure in the contents of the cranium causes headache. Often has a patient told me that if they could get their eyes to run or nose to run or could spit, they have found their headache relieved.

In an old person with severe headache one often notices that it is relieved by epistaxis.

How often is an influenzal headache relieved by a small poultice on the nape of the neck ? But how some practitioners can reconcile their consciences by prescribing alcohol in cases of influenza, where diminution of intracranial pressure is required, I know not, to my mind it is one of the greatest mistakes in therapeutics. Alcohol may be a preventive but a curative agent it is not.

How many students during hard reading find relief from the cold damp towel to the head ?

How often are epileptic fits stopped by pressure on the carotids ?

After an epileptic fit the patient as a rule falls into a sleep.

The Japanese use pressure on the carotids to cause sleep, this caused certain British lay papers to throw ridicule on Japanese methods but to me the method is a perfectly real and practical truth.

The Chinese also pay attention to blood pressure. I have frequently seen in cases of sun-stroke where the patient had a high temperature and vessels full, the /

the Chinese apply cold in a very effectual way by thick slices of mush melon covering the body, this remains cool for a long time. On the other hand in cases of heat apoplexy they relieve blood pressure by pinching the skin with two fingers until the part is almost prune juice coloured and the patient looks as if he had an attack of severe purpura, only the areas are as a rule very symmetrical. They also let blood by means of a long needle pushed into the soft tissues to a considerable depth in the region of the vessels ; in an emergency I have seen a Chinese woman do it by means of a long hair pin which somewhat resembled our ladies hat pins only it was larger in diameter.

Pointing to the fact that they likewise recognise that blood pressure influences convulsive disorders. Also by the laws of physics regarding the driving head of a fluid we can prove that by the addition of the placental circulation to ordinary circulation the flow of blood in the blood vessels is less easy. The heart must produce greater pressure and therefore must work harder, and therefore tends to become hypertrophied in pregnancy. And therefore has a tendency to increase blood pressure if the nervous system did not regulate the heart beat.

Jacksonian Epilepsy:- is a localized dilatation by which the cerebral fluid is displaced to counter-act /

counteract the rise in blood pressure and a localized irritation, the condition may go no further, on the other hand it may go the length of general epilepsy or even apoplexy.

In a case of my own Jacksonian Epilepsy lasting four days preceeded an attack of apoplexy.

In Menière's Disease we have exactly the same condition, it is not a distinct disease but a Jacksonian Epilepsy occurring in a definite area.

After a cerebral haemorrhage we as a rule have a localized pressure by the presence of a clot, this is compensated for by displacement of nervous fluid if this displacement becomes deranged then we have again convulsions - Post Apoplectic Epilepsy.

In all my post-mortem examinations of cases of idiopathic epilepsy I found nothing but dilation of vessels and obliteration of perivascular lymph spaces.

The number of so called ideopathic epilepsy cases is small as a rule there is an impression got from some source or an unevenly developed cranium or a depression in a bone of the cranium. I have seen as a cause and when raised the fits disappeared. Disease I have seen as a cause.

Bromides do good in those conditions not by acting as nerve sedatives but by their combination with potassium acting on the heart and blood vessels and bringing about contraction of vessels. In cases of/

of Epilepsy the difference between the action of Bromide of Potash and Bromide of Ammonia is marked.

Ice bags to the head contract the vessels, hot applications round the limbs withdrawing the blood from overloaded organs.

Chloroform must be pushed, there is a great risk in the early stages of administration in cases of Eclampsia. In Epilepsy trephining is beneficial also Venesection.

Alcohol on no account should be given in any form of convulsion.

But frequently the ordinary practitioner sees the next door neighbour giving alcohol in a case of apoplexy.

Not one of the numerous drugs used by the practitioner is curative of Epilepsy. The only curative agent in cases of idiopathic epilepsy is to be found in an epileptic colony where change of life and surroundings may dispel the cause.

In treatment there is probably a future for Lumbar puncture in Heat Apoplexy also in Epilepsy and Eclampsia as it affords a most practical method of varying the intracranial or nerve fluid pressure. In heat Apoplexy it is of undoubted value. I have seen no record of it having been used. Since forming those opinions there has appeared in the British Medical Journal of October 24th 1903 an abstract from/

from a paper by Professor Mc.Vail of Glasgow on
 "Spinal puncture in Uraemia" which I repeat, for I
 agree with his statements.

"He says Oedema in acute renal affections de
 "develops suddenly, and is universal, afterwards it is
 "influenced less or more by gravitation. Primarily
 "all the tissues of the body are involved, particularly
 "the connective tissue which is present in every
 "structure and organ. The connective tissue in the
 "brain is involved in the general oedema. There is
 "thus produced a condition of increased intracranial
 "overpressure, as the cranium is an undilatable chamber.
 "Increase of tension within the cranium unless
 "developed extremely slowly, is accompanied by pain.
 "This pain is severe in proportion to the rapidity
 "of development of the pressure. This is true alike
 "of tumour and haemorrhage, and must equally be true
 "where intracranial oedema occurs. Where intra-
 "cranial pressure is increased suddenly, as in
 "apoplectic haemorrhages, convulsive movements may
 "occur, accompanied by or followed by unconsciousness,
 "and if the pressure be still greater in degree,
 "respiration may be interfered with and may be brought
 "to a standstill. This is frequently seen in intra-
 "cranial haemorrhage, whether outside or inside the
 "brain. In renal affections intracranial oedema
 "frequently causes severe pain, convulsions may occur,
 "and coma usually ending in death may also ensue.
 "Convulsions/

"Convulsions and coma occurring in connexion with
 "albuminuria have very generally been regarded as the
 "effects of uraemic poisoning. I have for some years
 "past been in doubt as to the truth of this poisoning
 "theory.

"Should the symptoms of convulsions and coma in
 "renal disease be due to intracranial pressure, that
 "pressure obviously would be lessened by puncture and
 "drainage of the spinal arachnoid space. In the year
 "1900, and again in the present year of 1903, I had
 "opportunity of practically determining this question.
 "In the first of these years a patient with acute
 "albuminuria and oedema, after severe intracranial pain
 "followed by convulsive attacks repeated during thirty-
 "six hours, had become almost blind and notwithstanding
 "free perspiration by hot-air baths and pilocarpin he
 "finally became comatose. He had the operation of
 "spinal puncture performed on him at my request in my
 "ward in the Glasgow Royal Infirmary by Dr. Knox,
 "Professor of Clinical Surgery. The spinal fluid
 "fell in drops from the cannula for three-quarters of
 "an hour, when the cannula was withdrawn. In all,
 "about 6 drachms of fluid escaped, the patient being
 "entirely unconscious, no anaesthetic general or local
 "being required. Within four hours the patient began
 "to regain consciousness and his sight to return. He
 "slept a natural sleep during the night, and woke in
 "the morning entirely free from pain or mental dull-
 "ness or confusion, and with perfect vision. He
 "had/

"had no knowledge of anything that had happened for
"two days previously. No more fits occurred. The
"urine rapidly increased in amount, the albumen
"rapidly diminished, the oedema disappeared and he
"left the hospital some weeks afterwards with only a
"trace of albumen present in the urine.

"The second case was that of a man in whom albumin-
"uria had quickly developed but with moderate oedema
"of the surface. In a few days he had become
"mentally confused and he was still mentally con-
"fused when admitted to my ward in the Royal Infirmary.

"It was doubtful if he was at all conscious when he
"came. His urine contained a large amount of albumen

"Hot-air baths and pilocarpin produced free perspira-
"tion but without benefit to his cerebral state, and
"thirty-six hours after admission the comatose con-
"dition was deep. In Professor Knox's absence Dr.
"Patrick, Assistant Surgeon to the Royal Infirmary,
"at my request performed spinal puncture. Again the
"cerebro-spinal fluid issued in drops. After fully
"an ounce had escaped the canulla was withdrawn.

"Again as in the first case, at the end of about four
"hours, consciousness began to return. In the night
"he slept comfortably, by the morning he was entirely
"rational. The urine rapidly increased, and when he
"left the hospital there was no trace of albumen. He
"stated that he recollected being taken out of his
"house/

"house in the country to be conveyed to the Royal Infirmary, but that from the leaving of his house until the evening of the day on which the spinal puncture had been performed his mind had been an absolute blank.

"The result of the spinal puncture in these two cases proves, in my opinion, that the pain, the convulsions, and the comma of acute albuminuria are due in many, if not in all, instances to the sudden increase of intracranial pressure, and not to uraemic poisoning of nerve centres. They further prove that this increased intracranial pressure may be in at least some instances, effectually relieved by spinal puncture, and that uraemic coma is by no means necessarily fatal in its result where puncture and drainage are successfully performed." With these statements of Prof. McVail as I have said I agree, but I go further and say again that Lumbac puncture in Heat Apoplexy, Epilepsy and Eclampsia is probably the future treatment.

Anaemia of the brain may be due to increased intracranial pressure if so then we may be sure that we have the disappearance of the blood compensated for by something else, either a tumor, abscess, increase of fluid, thickened bone, but at the same time cerebral anaemia may be syncopal and the patient unconscious, if so we do not see convulsions because the brain areas are not stimulated but we shall find to a certain extent increase of fluid, not in large quantities however because the brain is not overworked but the opposite, what increase in fluid there is occurs for /

for pressure purposes.

In hydrocephalus we have a derangement from the fluid side the superabundance of fluid being compensated for by degeneration of the brain and expansion of the cranium.

Chorea is another disease classed as functional.

It is slow in its onset and usually associated with a rheumatic constitution. It is said to be due to a "toxin" closely associated with "rheumatic poison". The toxin again is an autointoxicant. I consider that in some manner the autointoxicant in rheumatism depends on the secretion known as perspiration. As regards rheumatism being infectious I cannot yet favour that view as the cases which I attended which gave rise to that opinion were placed in similar atmospheric conditions and surroundings and again nervous impressions might have an effect. Rheumatic remedies do good in chorea because they relieve the autointoxicant. Salicylates do no good unless they produce perspiration this perspiration may be slowly produced but if produced at all, it is beneficial.

The condition of the sweat glands in a case of scarlet fever and the relationship between scarlet fever and rheumatism points to what the intoxicant is. I have frequently observed that post-scarlatinal rheumatism varies in severity with the extent of the fever rash, - if little rash then the rheumatism is slight if the rash be marked then the rheumatism is usually severe.

I had a patient with rheumatic tendencies aged

72 years, she never had an apoplexy, her general health was good, eyes normal, she had received no injury. For twelve years preceding the period of my observations she had been subject to what were described as choreic movements. When I saw the case the movements were under control, she could feed herself, at irregular periods she had epileptic fits which left her stupid, when she got over this to a certain extent she showed tremors, slurring speech, unsteady gait, there was no vomiting. In this case we had a strong impression as the cause.

In conclusion let me state that I am of the conviction that several of those disorders (not diseases) classified as functional disease of the nervous system, are autointoxications and they are not, many of them, distinct diseases but forms and stages of the same disease. They are disorders of blood circulation and fluid circulation and by this disturbance within the cranium, the pressure is not maintained in a uniform and constant condition.
